

WHAT IS CLAIMED IS:

1. A cooling unit to cool a heat generating component, comprising:

5 a heat sink arranged adjacent to said heat generating component;

a heat diffusing member arranged between said heat generating component and said heat sink;

10 a first heat conducting member interposed between said heat generating component and said heat diffusing member to thermally connect said heat generating component and said heat diffusing member; and

15 a second heat conducting member interposed between said heat diffusing member and said heat sink to thermally connect said heat diffusing member and said heat sink.

2. The cooling unit according to claim 1, wherein said heat sink has area dimensions greater than said heat generating component.

20 3. The cooling unit according to claim 1, wherein said heat diffusing member has a thermal conductivity higher than said second heat conducting member and area dimensions greater than said heat generating component.

25 4. The cooling unit according to claim 1, further including a spring member to urge said heat diffusing member towards said heat generating component.

5. A cooling unit according to claim 1, wherein said first heat conducting member is less thick

than said second heat conducting member, and said second heat conducting member is displaced in a direction of thickness.

5           6. A cooling unit according to claim 1, wherein  
said heat generating component has a radiation surface, and said heat diffusing member has a first thermal contact surface facing said radiation surface and a second thermal contact surface facing said heat sink, said first and second thermal contact surfaces  
10 each having an area larger than said radiation surface.

7. A cooling unit according to claim 6, wherein said heat diffusing member is urged toward said heat generating component by springs.

15           8. A cooling unit according to claim 1, wherein  
said heat generating component has a plurality of corners along an outer periphery, and said heat diffusing member has a plurality of engaging sections to be engaged with the respective corners, a positional relationship of said heat generating component and said  
20 heat diffusing member being defined by mutual engagement of said corners and said engaging sections.

9. A cooling unit according to claim 8, wherein said heat diffusing member has a plurality of tongues to be removably hooked to said heat generating  
25 component.

10. A cooling unit according to claim 1, wherein said first heat conducting member has a thermal

conductivity higher than said second heat conducting member.

11. A cooling unit according to claim 1, wherein  
said heat sink has a heat receiving portion held  
5 in contact with said second heat conducting member, and  
a heat exchanging portion thermally connected to said  
heat receiving portion and separated from said heat  
generating component.

12. A cooling unit according to claim 11, further  
10 including a fan that feeds cooling air to at least said  
heat exchanging portion of said heat sink.

13. A cooling unit, comprising:  
a semiconductor package having a heat generating  
IC chip;

15 a heat sink arranged adjacent to said  
semiconductor package, said heat sink having area  
dimensions greater than said IC chip;

a heat diffusing member arranged between said  
semiconductor package and said heat sink;

20 a first heat conducting member interposed between  
said IC chip of said semiconductor package and said  
heat diffusing member to thermally connect said IC chip  
and said heat diffusing member;

a second heat conducting member interposed between  
25 said heat diffusing member and said heat sink to  
thermally connect said heat diffusing member and said  
heat sink; and

a gap between said IC chip and said heat diffusing member being narrower than a gap between said heat diffusing member and said heat sink, said heat diffusing member having a thermal conductivity higher than said second heat conducting member and area dimensions greater than said IC chip.

14. A cooling unit according to claim 13, wherein said semiconductor package is mounted on a circuit substrate, and said heat diffusing member and said heat sink are respectively made of electrically conductive materials, said heat diffusing member being electrically connected to said circuit substrate by way of said heat sink.

15. A cooling unit according to claim 14, wherein said heat diffusing member is pressed against said IC chip by electrically conductive springs interposed between said heat diffusing member and said heat sink, and said heat diffusing member and said heat sink are electrically connected to each other by way of said springs.

16. A cooling unit according to claim 13, wherein said semiconductor package has a base substrate bearing said IC chip mounted thereon, and said heat diffusing member is rigidly secured to said base substrate.

17. A cooling unit, comprising:  
a circuit substrate having a mount surface bearing

a plurality of grounding pads;

an electronic component mounted on said mount surface of said circuit substrate, said electronic component having a heat generating section arranged on a side opposite to said mount surface;

a heat sink arranged adjacent to said electronic component and having area dimensions greater than said heat generating section;

a heat diffusing member arranged between said electronic component and said heat sink and having area dimensions greater than said heat generating section;

a first heat conducting member interposed between said heat generating section of said electronic component and said heat diffusing member to thermally connect said heat generating section and said heat diffusing member;

a second heat conducting member interposed between said heat diffusing member and said heat sink to thermally connect said heat diffusing member and said heat sink; and

a gap between said heat generating section and said heat diffusing member being narrower than a gap between said heat diffusing member and said heat sink, said heat diffusing member being made of an electrically conductive material having a thermal conductivity higher than said second heat conducting member and provided with a plurality of terminal

sections to be respectively connected to the corresponding grounding pads of said circuit substrate.

18. A cooling unit according to claim 17, wherein  
said heat sink has a plurality of bosses  
5 projecting toward said circuit substrate and rigidly  
secured to said circuit substrate at positions  
respectively corresponding to said pads, and said  
terminal sections of said heat diffusing member are  
pinched respectively between said corresponding pads  
10 and front facets of said corresponding bosses.

19. An electronic apparatus, comprising:  
a housing containing a heat generating component;  
a heat sink housed in said housing, said heat sink  
being arranged adjacent to said heat generating  
15 component, said heat sink having area dimensions  
greater than said heat generating component;

a heat diffusing member arranged between said heat  
generating component and said heat sink;

a first heat conducting member interposed between  
20 said heat generating component and said heat diffusing  
member to thermally connect said heat generating  
component and said heat diffusing member; and

a second heat conducting member interposed between  
said heat diffusing member and said heat sink to  
25 thermally connect said heat diffusing member and said  
heat sink, said heat diffusing member having a thermal  
conductivity higher than said second heat conducting

member and area dimensions greater than said heat generating component.

20. An electronic apparatus according to claim 19, wherein

5 a gap between said heat generating component and said heat diffusing member is narrower than a gap between said heat diffusing member and said heat sink, and said second heat conducting member is displaceable according to the gap between said heat diffusing member  
10 and said heat sink.

21. An electronic apparatus according to claim 19, further including a circuit substrate housed in said housing and bearing said heat generating component.

22. An electronic apparatus according to claim 21,  
15 wherein

said heat diffusing member and said heat sink are respectively made of electrically conductive materials, and said heat diffusing member is electrically connected to said circuit substrate by way of said heat  
20 sink.

23. An electronic apparatus according to claim 21, wherein

said circuit substrate has a plurality of grounding pads, and said heat diffusing member is  
25 provided with a plurality of terminal sections to be respectively connected to said grounding pads.

24. A cooling unit to cool a heat generating

component, comprising:

a heat sink arranged adjacent to said heat generating component;

5 a heat diffusing member arranged between said heat generating component and said heat sink;

a first heat conducting member interposed between said heat generating component and said heat diffusing member to thermally connect said heat generating component and said heat diffusing member; and

10 a second heat conducting member interposed between said heat diffusing member and said heat sink to thermally connect said heat diffusing member and said heat sink, wherein said heat sink has area dimensions greater than said heat diffusing member, and said heat  
15 diffusion member has area dimensions greater than said heat generating component.

25. The cooling unit according to claim 24, further including a spring member to urge said heat diffusing member towards said heat generating  
20 component.

26. A cooling unit to cool a heat generating component, comprising:

a heat sink arranged adjacent to said heat generating component;

25 a base substrate upon which said heat generating component is affixed, said base substrate having four corners;



a heat diffusing member arranged between said heat generating component and said heat sink, said heat diffusing member having four engaging sections corresponding to the four corners of said base substrate to allow said base substrate to fit with said heat diffusing member;

a first heat conducting member interposed between said heat generating component and said heat diffusing member to thermally connect said heat generating component and said heat diffusing member; and

a second heat conducting member interposed between said heat diffusing member and said heat sink to thermally connect said heat diffusing member and said heat sink.

27. The cooling unit according to claim 26, further including a spring member to urge said heat diffusing member towards said heat generating component.

28. The cooling unit according to claim 26, wherein said heat sink has area dimensions greater than said heat diffusing member, and said heat diffusion member has area dimensions greater than said heat generating component.

29. A method of assembling a semiconductor package with a heat diffusing member, comprising:

providing a base substrate upon which a heat generating component is affixed to form said

semiconductor package, said base substrate having four corners;

5 providing a heat diffusing member to be arranged between said heat generating component and a heat sink, said heat diffusing member having four engaging sections corresponding to the four corners of said base substrate to allow said base substrate to fit with said heat diffusing member;

10 interposing a first heat conducting member between said heat generating component and said heat diffusing member to thermally connect said heat generating component and said heat diffusing member;

15 fitting the four engaging sections of said heat diffusing member to the four corners of said base substrate; and

interposing a second heat conducting member between said heat diffusing member and said heat sink to thermally connect said heat diffusing member and said heat sink.

20 30. The method according to claim 29, further including providing a spring member to urge said heat diffusing member towards said heat generating component.

25 31. A heat diffusing member, comprising:  
a diffusion plate having a first thermal contact surface to engage a heat generating component and a second thermal contact surface to engage a heat sink;

and

a pair of lateral plates at opposite ends of said diffusion plate, said lateral plates extending perpendicularly from said diffusion plate to engage sides of a base component upon which said heat generating component is affixed.

32. The heat diffusing member according to claim 31, further including a pair of tongues extending from ends of each of the lateral plates to form engaging sections.

33. The heat diffusing member according to claim 31, further including a spring member to urge said heat diffusing member towards said heat generating component.

34. The heat diffusing member according to claim 31, wherein said heat sink has area dimensions greater than said heat diffusing member, and said heat diffusion member has area dimensions greater than said heat generating component.